Gaurisankar Sa, Nat Prod Chem Res 2017, 5:3(Suppl)
DOI: 10.4172/2329-6836-C1-012

Gaurisankar Sa

Bose Institute, India

Calcarea carbonica induces apoptosis in cancer cells in a p53-dependent manner via an immuno-modulatory circuit

Homeopathic remedies are reported to have healing potential for various diseases including cancer although the mechanism underneath their anticancer effect has remained unexplored. To this end we attempted to evaluate the anti-cancer effects of the homeopathic remedy, Calcarea carbonica and simultaneously investigated the detail molecular mechanism underlying this drug-induced tumor regression. Interestingly, although Calcarea carbonica administration to Ehrlich's aAscites Carcinoma (EAC)- and Sarcoma-180 (S180)-bearing Swiss albino mice resulted in 30-35% tumor cell apoptosis, it failed to induce any significant cell death in *ex vivo* conditions. These results prompted us to examine whether Calcarea carbonica employs the immuno-modulatory circuit in asserting its anti-tumor effects. In tumor-bearing mice, there was profound depletion of $CD4^+$ and $CD8^+$ cells in peripheral blood, the dominance of type-2 T helper cells and inhibition of T cell proliferation. Calcarea carbonica, in turn, prevented such loss of effector T cell repertoire, reversed type-2 cytokine bias and attenuated tumor-induced inhibition of T cell proliferation in tumor-bearing host. To confirm the role of immune system in Calcarea carbonica-induced cancer cell death, a battery of cancer cells were co-cultured with Calcarea carbonica-primed T cells. Our results indicated a "two-step" mechanism of the induction of apoptosis in tumor cells by Calcarea carbonica, i.e., (1) activation of the immune system of the host; and (2) induction of cancer cell apoptosis *via an* immunomodulatory circuit in a p53-dependent manner by down-regulating Bcl-2: Bax ratio. Bax up-regulation resulted in mitochondrial transmembrane potential loss and cytochrome c release followed by activation of caspase cascade. Knocking out of p53 by RNA-interference inhibited Calcarea carbonica-induced apoptosis thereby confirming the contribution of p53. These observations delineate the significance of immuno-modulatory circuit during Calcarea carbonica-mediated tumor apoptosis. The molecular mechanism identified may serve as a platform for involving homeopathic inclusions into immunotherapeutic strategies for effective tumor regression.

Biography

Gaurisankar Sa completed his PhD at University of Calcutta, India, Currently he is working at the Division of Molecular Medicine as a Senior Professor, He has been a Post-doctoral Fellow, at Cleveland Clinic, USA from 1992-2012. He has published more than 55 papers in reputed journals.

gauri@jcbose.ac.in

Notes: